The Beagle, Occasional Papers of the Northern Territory Museum of Arts and Sciences, 1985, 2(1): 149-150

THE EXISTENCE OF SHARP, PERSISTENT BOUNDARIES BETWEEN LOCAL POPULATIONS OF *SORGHUM INTRANS* AND *S. STIPOIDEUM* IN TROPICAL NORTH-WEST AUSTRALIA

MARTIN H.ANDREW
Division of Tropical Crops and Pastures, CSIRO,
P.M.B. 44, Winnellie, NT 5789, Australia.

ABSTRACT

Pure swards of the annual grasses *Sorghum intrans* and *S. stipoideum* abut each other along sharp boundarics in the Pine Creek region of the Northern Territory. Four such boundarics were monitored, and these have remained virtually static for five years. This is noteworthy for two annual species which lack a persistent seedbank.

KEYWORDS: semi-arid tropics, *Sorghum,* annuals, pattern, boundary, species distribution.

The tall annual grasses *Sorghum intrans* F. Muell. ex Benth. and *S. stipoideum* (Ewart and White) C.A. Gardner and C.E. Hubbard are a prominent feature of the understorey of large areas of the eucalypt savannas of tropical north-west Australia, where they occur on sandy or gravelly soils. These two species, which look alike, occur together in the Pine Creek area where they form an almost continuous cover of annual sorghum in the rainy season. I observed, however, that their distributions are locally disjunct: each occurs as pure populations in discrete, contiguous patches, generally of one ha or more, separated along sharp boundaries <1 m wide (see Fig. 1). This can easily be observed towards the end of the rainy season in March when *S. stipoideum*, the earlier maturing species (Andrew and Mott 1983), is setting seed and has dark brown seedheads, in contrast to the whitish- greeen of the freshly-emerged flowerheads of *S. intrans.*

How persistent are these boundaries? To examine this, I monitored four boundaries, annually, along the Stuart Highway between Pine Creek and Katherine, N.T., using permanent photopoints. The local boundaries between *S. intrans* and *S. stipoideum* were very persistent in their precise loeations over this period. Fig. 1 shows paired photographs, five years apart; results for the intervening times, and for the boundary not shown, were the same.

I have observed sharp boundaries to occur also between contiguous, pure populations of ecotypes of *S. intrans* which have different times of maturity (and hence the patterning can be observed easily at the end of the rainy season); examples are in the Howard Springs district (12°12′S 131°08′E), and in Kakadu National Park (between Jabiru and Jabiru East (12°39′S 132°52′E), near Nourlangie Roek (12°52′S 132°48′E), and on the road to Airstrip Billabong (12°52′S 132°45′E).

The existence of this patterning is particularly noteworthy because these are both strictly annual species which lack a persistent seedbank, i.e. the plants present in one rainy season are derived entirely from seed set at the end of the preceeding rainy season (Andrew and Mott 1983). Over time, this is likely to result in an intermingling of the populations, notwithstanding the restricted seed dispersal of these species (mostly <1 m, Andrew and Mott 1983). There are no obvious adaphie differences across the *S. intrans/S. stipoideum* boundaries to explain this patterning, and the two species are not distributed consistently with respect to local relief: for example, sometimes *S. intrans* occurs at the top of a local rise, and sometimes *S. stipoideum.* With the *S. intrans/S. intrans* boundaries, the later maturing ecotype tends to occur lower in

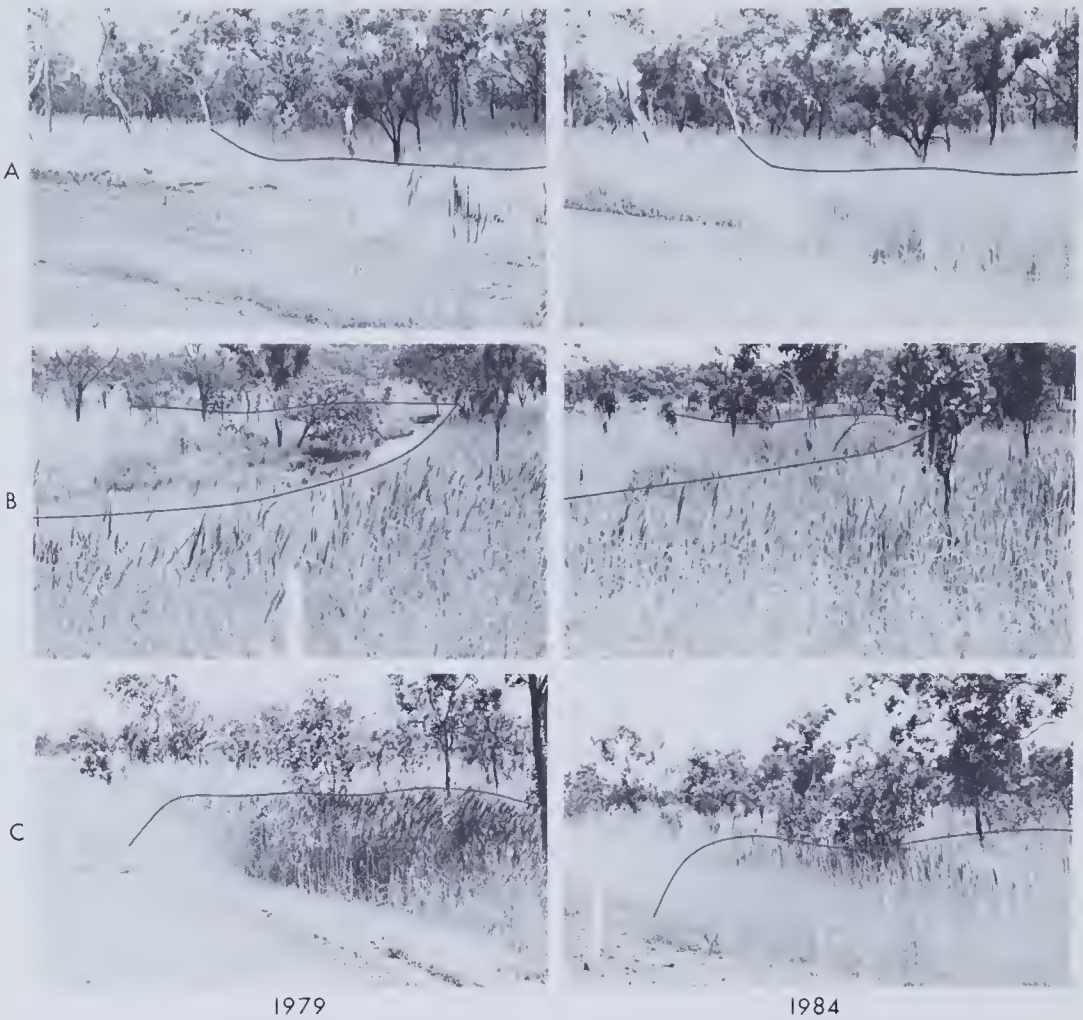

Fig. 1. Photopoint photographs of three sites showing the boundaries (————) between *S. intrans* and *S. stipoideum* on 7 March 1979 and 13 March 1985; **A**, site 1 (13°57.20'S 131°54.47'E, 18.0 km towards Katherine from the Pine Creek township turnoff at top of a crest); **B**, site 2 (14°02.31'S 131°56.50'E, 1.45 km towards Katherine from the Cullen River Bridge); **C**, site 3 (14°13.59'S 132°3.03'E, 21.3 km towards Katherine from the Fergusson River Bridge). *S. intrans* is the lighter tone, towards the left-hand side in each case. Site 4 (not shown) is located at 13°57.21'S 131°54.48'E, 100 m towards Katherine from site 1.

the landscape (although it should be noted that the terrain has little relief), and at least at Howard Springs, on heavier soils. The boundaries at Howard Springs seem to be persistent, as judged from casual observations over time, but I have no repeat observations for the Kakadu boundaries.

The reasons for the sharpness and persistence of these boundaries deserve investigation.

ACKNOWLEDGEMENTS

I am grateful to Jeff Corfield who took the annual photographs and made useful observations, and to Mark Lonsdale, Doug Abrecht and Bill Winter for comments on the manuscript.

REFERENCES

Andrew, M.H. and Mott, J.J. 1983 Annuals with transient seedbanks: the population biology of indigenous *Sorghum* species of tropical north-west australia. *Australian Journal of Ecology* **8**: 265-76.

Accepted 20 September 1985